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# Learning as Fun: What Video Games Do that Classrooms Do Not

Christian de Luna  
dechris@sas.upenn.edu

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## **Abstract**

This paper explores the idea of learning from video games, a subject which has earned increased attention over the past several years in the academic community, yet remains an area in need of even further exploration. The author discusses how particular elements of video games are beneficial to learning and considers how these concepts may be applied to the classroom or homework settings, considering both the potential advantages and disadvantages of employing this technology.

## ***Learning as Fun: What Video Games Do that Classrooms Do Not***

*Christian de Luna*

Education, for some, is not enjoyable. Education often entails hard work, which then ideally leads to a successful life. If one does not go to school, then one will not succeed (though a few individuals managed to do well enough without a complete and formal education, such as Bill Gates, Mark Zuckerberg, and Albert Einstein). For all of us non-Gates, Zuckerburgs, and Einsteins, however, school remains a necessity for success. I do not intend to disparage the need for education, nor will I suggest that everyone drop out of school and loll around for the rest of their lives. What I simply seek to investigate is if it would be possible to make the hard work required of school a more enjoyable experience.

Ask a student if he or she remembers how the Cuban Missile Crisis was averted through negotiations between the USA and the USSR over Poland. Now ask a gamer who has played Konami's *Metal Gear Solid 3: Snake Eater* for the Playstation 2 (PS2) if he or she remembers how it was (fictionally) defused as a result of the US return of Russian rocket scientist Nikolai Sokolov to the Soviet Union so that he could finish the development of the Shagohod, an ICBM-firing tank capable of assaulting the States from Russia. Ask another student if he or she remembers the process by which hydrogen fuses to create massive explosions capable of destroying civilizations in mere moments. Then ask another gamer if he or she remembers how 10 Sea Dragon Crystals can fuse to a Steal Gun to provide a high enough "Scale" rating to upgrade it to a SUPERNOVA, a gun capable of decimating dragon- and aquatic-type enemies in a mere instant in *Level 5's Dark Cloud 2* on the PS2. Though experiments to gauge such recollections are limited (if they even exist), what one may discern is that the facts learned in a video game would most likely be more memorable than those learned in the classroom.

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What is the difference between these two methods of information dissemination? In the classroom, a student may passively hear and read facts outside of a meaningful context and then commit those facts to memory to pass an exam. In most video games, the gamer is directly involved in the action and needs to learn those facts in order to understand and survive in the game. What is most interesting is that the gamer voluntarily subjects himself to learning this information without the objections offered by many students inside and outside the classroom.

One can thereby surmise that something in video games encourage students to willingly learn vast amounts of information while still enjoying that experience in the process. Through this paper, I will touch upon elements of game design that contribute to the influence of games on the player's mind. I will also mention educators who implement these strategies inside and outside the classroom. In sum, this essay will argue that elements and theories of game design can enhance the process of learning in education, creating a more enjoyable and engaging experience.

### ***What keeps Gamers Gaming?***

#### ***Interactivity and Choice***

One of the most noteworthy design features of video games is the interactivity experienced by a player as he plays a game. When a player presses a button on the controller, a menu opens on the screen. When he tilts the control stick, his character moves. When a player inputs a command, the game displays that command's output in the game. This is arguably the most commonly recognized form of interactivity in gaming, but it is not the only type experienced.

Unlike most media, games<sup>1</sup> allow their users to make choices, and the effects of those choices have a bearing on how the narrative is carried out. In some games, a player is granted the ability to customize the appearance and attributes of the character that he will play. This character is often known as an avatar and the decisions made in designing an avatar can contribute extensively to the way the game will be played. Additionally, a player often makes choices on how and when to proceed with the main narrative of a game. A player may decide to start a mission now or later depending on a number of factors such as if the player feels prepared for it at his current level or if he has fulfilled the requirements to undertake the mission. The player has the ability to develop the game's plot according to his desires.

Additionally, how the player chooses to conduct himself during a mission plays a role in the design of the narrative. In many games, the player can decide to act virtuously or maliciously, which bears on how other characters regard the player's character and what missions and abilities a character may access. These decisions contribute to the overall development of the main character (and in some cases, the supporting characters as well). Essentially, the choices a player makes can have a strong influence on the way the story unfolds, a degree of interactivity with a narrative medium never before experienced.

### ***Instantaneity and Failure***

Another feature of interactivity is the speed at which the results of a player's action are delivered and the speed at which the player can amend his actions based on the given results. If a player uses an ability that is ineffective against an opponent, then he can immediately adapt his strategy accordingly to utilize a more effective skill. This instantaneous feedback system found

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<sup>1</sup> In this article, the majority of the games discussed will be Role-Playing Games and Adventure Games as they have demonstrated the most capability for player choice and action though other genres are deepening the player's customizability in experience as well.

in video games allows the player to immediately assess whether his thoughts and actions were well chosen or if he needs to revise his strategies in order to try again.

For example, in Bioware's sci-fi shooter-RPG, *Mass Effect 2*, the player assumes the role of Commander John Shepard, first human Spectre and intergalactic hero. Throughout the player's travels, he engages in a number of intensive and strategic firefights that require diligence and foresight. The battles require the player to think about his actions thoroughly before engaging the enemy. As most players quickly learn, charging in with guns blazing only works as a good strategy to get to the "game over" screen quickly.

Instead, one must think about a variety of elements in preparation for battle including: the efficacy of arms available pitted against the defenses of the enemies to be encountered (from submachine guns that work well against shields and biotic barriers to heavy weapons better suited against armored robotic enemies), the advantages and disadvantages of the powers to be utilized (from biotic abilities that work well against biological enemies to tech abilities better suited against synthetic and robotic opponents), and the layout of the terrain (including choke points, cover spots, high ground, etc.). Additionally, players must consider their decisions three times over because two other crew members (of a possible eight, each with his own weapons and abilities better suited against specific enemies) accompany Shepard into the fray.

It may seem overwhelming, but even though there are many aspects that one must consider for each individual battle, once the player realizes that an initial strategy did not work, he is immediately given the chance to try again constantly adapting approaches. The game allows the player to prepare multiple strategies for a task and then immediately assess the outcomes of those strategies so he may better adapt them for future tasks. If a strategy does not work, the player can often "Try Again." With perseverance through constructive, adaptive

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experiences, the player eventually achieves victory thanks to the sometimes brutal, but often forgiving, learning process facilitated by the game. What is most important about this process though is that, as exhibited, in order for the game to proceed, the player *must* succeed.

Now consider the degree of instantaneity afforded to students in terms of current educational models. In most classrooms, adaption and reevaluation is a luxury seldom available. Students spend hours cramming as much information in their textbooks as they can. They devise methods on how to approach questions and problems both in thought and practice. They analyze and prepare for various scenarios that may appear in an upcoming assessment. They complete practice problems and exams, simulating the testing environment as closely as possible. When the moment of assessment finally arrives, some manage to score well while others comprise the rest of the curve. Either way, all of that planning and strategizing no longer matters because that one assessment will be the only one that counts on a student's record. In current education, generally speaking, there is no second chance, no "Try Again".

Current educational models do not allow for instantaneous feedback and responsive adaptation. Instead, they prefer a different form of instantaneity, one that often labels a student according to a single moment regardless of potential. If you do not succeed at the first instant, then unfortunately, there will not be a next time, not until the final at the very least. However, by then, your doubt in your abilities may be fully instilled. What is most discouraging about this system, however, is that unlike in games, if a student does not succeed, he still usually proceeds. Many schools, unfortunately, have neither the time nor the resources to ensure that everyone can keep pace with curriculum. If a student falls behind in a subject, then he must seek help from a teacher or a tutor on his own time weighed by the mentality that he is a failure who needs help to do what his classmates seem to do with ease. If he is unable to catch up by the time the next

academic year begins, then he is relegated to repeat his previous grade level with the mentality of a failure, unable to believe in himself and unwilling to try again.

When one takes a step back and evaluates both methods of learning, one notes that both involve failure, yet one method is remarkable for encouraging participants despite their failures. As Gee mentions, “in video games, losing is not losing, and the point is not winning easily or judging yourself a failure. In playing video games, hard is not bad and easy is not good”.<sup>2</sup> Gamers inexplicably (at least to non-gamers) rise to the challenge after dying over and over again. Why? Because they can.

Unlike in school, gamers are allowed the option to “Try Again” once they receive a failing grade (a “game over”). In fact, gamers are even highly inclined to do so, especially with more arduous challenges. Psychologist Mihaly Csikszentmihalyi describes this desire to persevere in spite of failure as the “flow” mentality. Essentially, flow is a state of pleasure derived from developing mastery over a task or subject. Promoting flow within a game is essentially akin to the problem of Goldilocks and her porridge; the player must find the appropriate degree of difficulty according to his current abilities. “Too hot” (or too difficult) and the player will be unwilling to try again in fear of being burned by the task at hand. “Too cold” (or too easy) and the player will not want to continue playing simply because the problem is too simple and boring to be bothered with. Prensky describes the sentiment in the following way: “As long as a game remains constantly just hard enough to make a player feel challenged while also providing the feeling of ‘I can do this if I really try,’ people will want to continue playing”.<sup>3</sup>

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<sup>2</sup> James Paul Gee. *What Video Games Have to Teach Us about Learning and Literacy*. (New York: Palgrave Macmillan, 2007), 175.

<sup>3</sup> Mark Prensky. *Don't Bother Me Mom—I'm Learning!* (St. Paul: Paragon House, 2006), 59.



Each player hopes to challenge himself at a constant level of difficulty that is never too difficult to complete or too simple to be engaging. Gamers like their games “just right”.

Some games even go a step further to ensure that players find the right fit for their experience by providing difficulty levels that players may adjust in order to optimally utilize and hone their skills. When players pick up a game from an entirely unfamiliar genre (i.e., Role-Playing Games or First Person Shooters), they usually start off on an easy difficulty setting in order to familiarize themselves with the game’s mechanics while not being overwhelmed completing the game’s objectives. When starting a new game within a familiar genre, players usually select an average difficulty level as they only need to familiarize themselves with the specific elements of the game at hand. When gamers beat the game and start a second play-through, they usually select a harder difficulty in order to enhance their flow mentality as the challenges of earlier difficulties will assuredly not satisfy their skill level anymore.

Meanwhile, in schools, all students face the same difficulty level regardless of their level of skill. Students more or less receive the same rigid academic treatment whether the syllabus is either too easy or too difficult for them. As Gee describes it: “many so-called advantaged learners rarely get to operate at the edge of their regime of competence as they coast along in a curriculum that makes few real demands on them. At the same time less advantaged learners are repeatedly asked to operate outside their regime of competence”.<sup>4</sup> It is true that there are accelerated programs for those who excel at early levels of assessments and supplementary courses for those who need additional practice within a subject; however, the more precisely educational design can accommodate for students individually, the more possible it will be to make learning an engaging and effective experience. After an exam, most students either

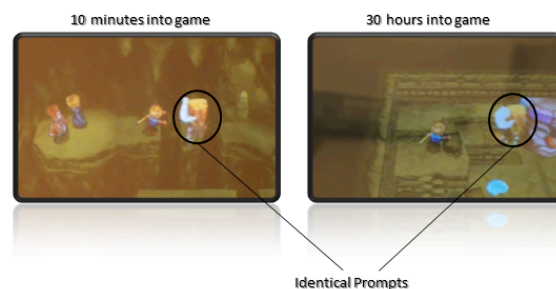
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<sup>4</sup> Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 68.

evaluate a test anywhere between very easy or very hard. Very rarely, however, do you hear of a student saying the test was challenging enough to make them want to try again if they did not succeed at first. In gaming, however, such a sentiment drives all game-play. Instantaneity keeps gamers gaming for hours; why not use these strategies to keep students studying?

### ***Constructive Learning***

Another learning device utilized in video games is constructive learning. In most video games, the player is rarely left to his own intuition to solve problems in the earlier levels of a game. If new players start a game without receiving instructions on how to play, then the confusion and frustration they may experience may discourage them from continue playing. Instead, games encourage and often require players to learn basic actions and corresponding strategies to conquer more intricate problems later in the game. Mayo discusses this gradual building of skills off of previously learned skills saying that “complex tasks are presented first as a small core experience that is practiced multiple times before being progressively extended into a longer, more complex sequence.”<sup>5</sup> This notion of progressive, constructive learning is well exhibited in a feature shared among most video games—the tutorial. For the first few moments of a game (from minutes to hours depending on the genre and length of the game), the tutorial walks one through the basic elements of game-play and exposes him to simple scenarios that utilize these rudimentary skills. As one progresses through the game, obstacles and corresponding strategies become more complicated; however, prior experience with earlier simpler, yet still similar, obstacles allow the gamer to critically reflect on past



<sup>5</sup> Merrilea J. Mayo. “Video Games: A Route to Large-Scale STEM Education.” (*Science*, January 2, 2009), 80.

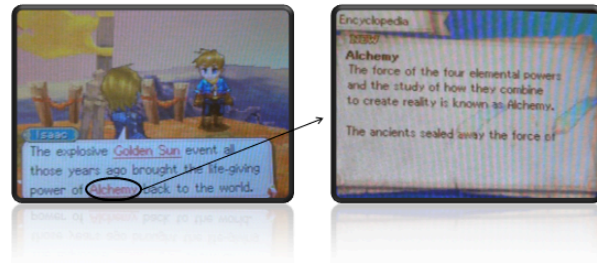
scenarios to develop appropriate strategies for the problem at hand.

One example of this gradual building of skills occurs in Camelot's *Golden Sun: Dark Dawn* for the Nintendo DS. The most recent installment in the series, *Dark Dawn* follows the protagonists, gifted individuals known as adepts, who are capable of harnessing the alchemic powers of the four elements: earth, water, wind, and fire. Adepts are capable of manipulating synergy, manifestations of the elements, for a variety of tasks such as moving pillars and casting down lightning. Each character has different synergies allotted to him or her according to elemental affinity. Apart from elemental attacks that are solely used against enemies, each adept has certain skills used to manipulate the world around him or her. The Earth adept Matthew is capable of casting "Move" which moves pillars, and the Wind adept Karis can cast "Whirlwind," which can be used to rotate certain objects and propel platforms across surfaces.

Early in the game one only has access to one or two of these moves and is explicitly told how to utilize them in specific scenarios. For example, the first object one uses "Move" on is a yellow, rocky pillar, which one must move in order to jump on top of it to cross a gap. Throughout the game, one encounters more identical pillars, but, in addition, one encounters more complex puzzles that requires him or her to push multiple pillars into certain positions in order to cross wider areas. One also finds other objects dissimilar to the yellow, rocky pillars but that are still similarly influenced by the "Move" synergy. The player learns to associate certain tasks with certain skills and is able to hone and master their implementation of said skills through repeated and relevant use.

*Dark Dawn* also uses contextual learning to help supplement the player's knowledge set by providing relevant plot information within the game's dialogue. As in many role-playing games (RPGs), the story is mainly related through text-based dialogue. In a character's speech

bubble, certain words and phrases relevant to the story occasionally appear underlined and in red font. Whenever these words appear, the player is allowed to tap the shoulder button on the Nintendo DS to access definitions of the highlighted words in case he is uncertain of the word's meaning or if he simply forgot what it was or meant. If something is unfamiliar to the player, he can readily and instantaneously recall the information in a moment when it is contextually relevant, usually when he needs to remember it during game-play.



With that, we return to the current trends in education. Though students are by no means asked to move pillars with their mastery over alchemy, the above does illustrate what students can gain from a more constructive approach to their education. Students are often asked to learn vast amounts of information usually far removed from the actual scenarios in which they are applicable (such as learning from a textbook without any relevant subjects or materials immediately at hand). This is the so-called “problem of content” in which textbooks throw students into unfamiliar situations without any contextual knowledge. Gee illustrates this dilemma in the following: “Imagine a textbook that contained all the facts and rules about basketball read by students who never played or watched the game. How well do you think they would understand this textbook? How motivated to understand it do you think they would be? But we do this sort of thing all the time in school with areas like math and science”.<sup>6</sup> When reading a textbook, a student may not fully comprehend the terminology and procedures of a subject and will thereby not be able to apply the relevant information in addressing and solving problems. To draw a real life illustration: how would you prefer to learn how to drive a car? By

<sup>6</sup> Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 23.

reading the owner's manual and attempting it from there? Or by actually sitting in the driver's seat and having someone instruct you on how to aptly apply pressure to the gas pedal or how to turn the wheel when it is relevant to do so?

Obviously, the analogs don't match up one-to-one, but, at the very least, I hope the basic message comes through clearly. Learning in the actual context allows the student to see which strategies work in which situations and which ones need to be calibrated for future scenarios. Current classrooms allow for very little contextual exposure to material. There is only so much lab time a science student can have during the school day. The only other times students are exposed to scientific concepts are when the teacher teaches during class or when students read them in the textbook at home; regardless, both situations cannot effectively provide students with the relevant and immersive contexts that allow them to better understand how terms and concepts are related and why certain strategies work well in certain situations.

Both video games and the classroom do allow for a degree of "tutorial" that teaches gamers and students basic skills and gradually builds those skills to allow for engagement with more complex tasks. The difference between the two methods lies, however, in the fact that video games allow players to move at their own pace and to keep grappling with obstacles or tasks until they feel proficient with them or until they complete them. The classroom, as mentioned, does not have the luxury of time to allow students to individually grapple with facts and skills in context. Teachers need to ensure that all students move at the same pace, and as hard as many of them try to help those who do fall behind, there is only so much a single person can do for potentially very many. Though a fifty-minute period may sometimes seem interminably long for some students, the fact remains that the teacher can still only cover so many topics within the timeframe. This is not even considering the additional time required to

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allow students to ask any questions they may have on the subject. Meanwhile, video games can include as much information as they are able to have programmed into them, and they allow players to move through and assess that information at their own pace.

Mayo illustrates the disparity between the two methods of learning, mentioning how in games, “content is further reinforced through continuous, immediate feedback: Almost every keystroke yields a response from the game. In contrast, students in a typical classroom get to ask 0.11 questions per hour”.<sup>7</sup> By no means is this always the case; some students thrive in such decontextualized situations; they do not require constant references to remember how concepts apply to certain situations. They are able to learn and utilize information with a limited degree of contextualization. But for those who cannot adapt as quickly as some of their peers, they are doomed to fall behind, regardless of whether or not they could become more proficient at the subject with more work and time.

### ***Motivators***

Though the aforementioned notions of instantaneity and contextuality do foster engagement for players, game designers know that small, yet specific, game mechanics can encourage gamers to continue playing games for hours. One such concept is that of the “Level-Up”. As Prensky mentions, “Emotionally...leveling-up means feeling yourself getting better at the game, and achieving mastery over something difficult and complex, something you couldn’t do when you started.”<sup>8</sup> It is acknowledging that you were at the base level of proficiency when you began playing but have succeeded to the point where your level of skill has become beyond proficient. In many video games, designers include metered representations of this progress. For example, in many Adventure Games such as *Super Mario Bros.* and *Sonic the Hedgehog* the

<sup>7</sup> Mayo, “Video Games: A Route to Large-Scale STEM Education.”, 80.

<sup>8</sup> Prensky, *Don’t Bother Me Mom—I’m Learning!*, 59.

player advances through a level and then eventually reaches the end of that one world.

Afterwards, he proceeds to the next, more difficult level and therefore has leveled up.

Leveling-up also take on another meaning in other genres such as Role-Playing Games (RPGs). In many RPGs, the player's characters defeat enemies and gain experience points for their efforts depending on the strength of the opponent

and the difficulty of the battle. More often than not, game designers include metered measures of this progress via some sort of experience bar to demonstrate how much experience a player's characters have gained and how much more they will need to level up. When a player's

characters level up, he increases in stats, parameters that measure character abilities such as Strength, Defence, Agility; gains improved weapons, armor, new skills and abilities; and obtains many other bonuses, depending on the game. For example, in all iterations of the *Pokémon* franchise, leveling-up entails gaining a boost in stats, the possibility of learning new skills, and most exciting, the evolution of a Pokémon into a stronger form. *World of Warcraft* signals a level-up by bathing the player in a glorious, golden light and grants the player the opportunity to purchase new skills from his tech(nique) tree, a graph that displays what abilities a player's character can learn. As Mayo mentions, "players accumulate points, levels, titles, or magic swords with some visible progress for even the tiniest successes. These rewards contribute to greater self-confidence/self-efficacy. Greater self-efficacy, in turn, translates to greater persistence and thus a higher level of accomplishment."<sup>9</sup> All of these bonuses serve as

World of Warcraft Tech Tree



<sup>9</sup> Mayo, "Video Games: A Route to Large-Scale STEM Education.", 80.

manifestations of the player's actual improvement in and mastery of the game, fostering a feeling of success for the player.

Another measure of metered progress more instantaneous than the level-up is found with objectives and rewards. In the real world, arbitrary points are indeed arbitrary. But when it comes to video games, however, seemingly trivial points can and do matter. On most current generation gaming systems, such as the Xbox 360 and the Playstation 3 (PS3), game designers have included reward systems that award players for completing in-game objectives. These rewards are known as achievements and trophies for the Xbox 360 and PS3 respectively.

In the case of the Xbox 360, achievements are points-based rewards (known as Gamer Points, or G) with a certain number of points to be earned depending on the difficulty of a task. For example, some games award players 5G for merely completing the tutorial or 150G for completing the game. Most importantly to note is the fact that once you complete the objective, the achievement automatically appears at the top of the screen to signify that you have succeeded with an objective. Though they have no in-game function or purpose, more often than not players are happy to receive achievements simply because of the instantaneous feeling of accomplishment derived from the successful completion of a task. Some strongly motivated players will go through whatever extra effort is necessary to collect all possible achievements in a game, even though they have no actual currency aside from status.

The level-up is a great means to build up a player's confidence; however, it is a very gradual one. Near the end (and middle) of some games it can take hours to increase by just a single level. What is interesting to note, however, is that to the gamer, those hours seem to pass quickly, for better or for worse. Rewards and objectives on the other hand are somewhat of a short-term equivalent to the level-up. Though the reward is significantly less valuable than those

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garnered from a level-up, the relative ease of access and the positive motivation still provide the player with a boost, especially when things do not seem to be going well in a game. Researchers hope to discern if implementing similar strategies in a classroom would yield similar results.

As one might surmise, the current system in education is not as enjoyable an experience as in video games. On the one side, educational models utilize a top-down assessment system that has all students aim towards the same standard of an “A” regardless of personal abilities. If you do not get an “A”, then that simply means you are not doing well in the class. Meanwhile, video games implement a bottom-up strategy that allows players to learn and develop skills at their own pace with a sign of increased mastery manifested in every level-up, whether through higher levels, stronger skills, or more powerful forms. The players visibly see how much they have improved and, in many cases, how much further they, are not required to, but *are able (and willing)* to go.

This is because objectives for both achievements and level-ups are incentivized; you as the player feel compelled to keep working because you actually desire the instantaneous and valuable (in-game) reward and the process to earn the reward is an enjoyable one. Education, on the other hand, does not have strong motivational factors driving the pursuit of high grades.<sup>10</sup> The stress of arduously studying only to receive a mediocre grade is hardly a gratifying experience. Even for those who do well on an assessment, the meaning of a grade is sometimes so far removed from the actual assessment that the effect of gratification could be diminished. The student may also not be willing or have the time to review what errors he made, spurning a potentially beneficial learning experience. I will acknowledge that, to some, this may sound as if

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<sup>10</sup> Apart from the success mentioned earlier in this paper. Whether the purpose of education should be to strive for success or to engage in and enjoy the process of learning is one that goes beyond the scope of this paper but is most certainly a core question of the field.

I suggest changing the grading system simply to make things easier for them—to baby their education. When one, however, considers that the core content learned would be the same regardless of method of implementation, then one realizes that the primary difference between the two learning constructs lies in the fact that one is more enjoyable and engaging.

### *Perspectives*

Another aspect of game design that deals with the mentality of users is the perspective change afforded in video games. This essentially means that players are able to look through the eyes of another person (an in-game character) and gain a glimpse into his motivations for doing what he does. They are able to see situations from the perspective of another identity. This potentially allows players to be exposed to points of views that they never would have imagined while still allowing them to weigh these views against their own beliefs. For example, in the role-playing game *Final Fantasy VII* for the Playstation (PS), the story follows the mercenary Cloud Strife who is enlisted by the rebel organization known as AVALANCHE. The opening scene of the game has you breaking into an energy reactor facilitated by the corrupt (from the perspective of AVALANCHE) SHINRA organization to destroy it. The player leads the characters through the reactor and eventually succeeds in sabotaging the reactor. Later on, the player learns the motivations behind why AVALANCHE sought to destroy the reactors and oppose SHINRA, and is therefore intended to sympathize with AVALANCHE's mission. One must consider, however, that from an outside perspective, AVALANCHE is a terrorist organization.

Obviously, this is a terrible strategy for selling video games to a world that already regards them, generally speaking, with disdain. What I seek to illustrate from this example is that video games allow a player to gain a glimpse into perspectives that he would never experience

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otherwise. If he were an inhabitant of that world rather than a player outside of the game, he would undoubtedly have felt a sensation of fear and panic after the event occurred and would most certainly feel contempt for AVALANCHE's action. The fact remains that the player is outside of the game and can learn and understand AVALANCHE's motivations for their actions without compromising his own personal conceptions and beliefs. I know that I will never seek to enter the office building of some corrupt organization and destroy it simply because I played *Final Fantasy VII* (and I have not heard of any of the other people who have purchased the ten million copies of this game sold to date doing so either). I *do not* advocate such acts in reaction to *any* social situation and do scorn those individuals who do resort to such methods; however, I do want people to acknowledge the powerful effect a video game can have in illuminating perspectives that a player may never encounter, or, more so, even consider.

Another growing concern is that video games induce a shift in perspective that promotes desensitization towards violence. Many cite violent video games such as the *Call of Duty* and *Grand Theft Auto* franchises as the motivators behind the acts of many heinous crimes. I will wholeheartedly acknowledge that those games do indeed desensitize violent acts, that there are those individuals who do feel influenced by and cite them as the impetus behind their actions; however, I have and know of many other people who have played these games and, not to trivialize the issue, have never felt the urge to go outside and engage in acts of violence.

In fact, some games actively emphasize the consequences of wanton acts of violence. For example, in the game *Fire Emblem* for the Gameboy Advance, one encounters a variety of different characters that join one's team throughout the journey as one encounters in most games. But unlike most games, *Fire Emblem* employs an in-game mechanic that encourages players to be as careful as possible when they engage enemies—characters die when defeated in combat.

As mentioned earlier, after characters dies, the player can simply revive them or wait until after the game over screen to try again, but in *Fire Emblem* this death is permanent. When a character is defeated in battle, he says his last words and after battle player discovers that the character is no longer able to be used. Such losses are particularly more painful the longer you have a character in your party as you have spent more time training and leveling them. The lesson learned: violence should not be trivialized as the potential losses and consequences could be devastating and irreversible.

As is often suggested, not everyone reacts to certain stimuli in the same way. To that I suggest more studies be conducted into why some people are affected in certain ways by video games while others are not. But to dismiss the possibilities of exposure to other perspectives (and all of the other aforementioned benefits as well) simply because a few individuals are too worried to give games even a single chance would be remiss for society.

With that, I return to another notion of perspectives capable of being imparted through video games. In addition to glimpsing into the internal perspectives of the characters and exploring how they feel and what motivates them, games allow players to look at the world through their external perspective as well; they allow players to imagine themselves in roles they could never imagine for themselves. To draw on earlier examples, *Mass Effect 2* allows you to be a legendary commander of a spaceship while *Golden Sun: Dark Dawn* allows you to be a brave warrior with incredible magical powers. Video games allow players to be someone beyond who they are and can be while they play.

What could be gained if we applied such concepts in the classroom? First, by devising games and in-class scenarios that allow students to enter the mind of characters or whole factions, students could potentially see into the internal perspectives of these agents and possibly

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gain a better understanding of their motivations and why they might have acted the way they did. Additionally, games could allow students to glimpse at roles that they never could imagine themselves in because their grades or the resources in their school districts prohibit them from thinking beyond what they are. By learning from the examples set by video games, students can potentially learn to understand themselves and others on a level never before imagined. How this can be done is a subject that requires much further research.

### ***Socialization***

With that in mind, I would like to address the additional impacts video games would be able to provide in the classroom in terms of social interaction. Yes, the reader may be thinking that video games cannot be a social experience. The traditional conception of a gamer is that of an antisocial loner who is incapable of conversing with another human being. The fear is that video games will continue to produce these reclusive individuals if we keep allowing the youth to play them. I will acknowledge that I have heard a few stories of individuals who had gotten so thoroughly engrossed in a game that they would neither eat nor sleep. (I will admit that I would occasionally become one of those people if a game was so utterly engaging). Games do indeed have the potential to isolate people inside their immersive environments, especially those who already feel marginalized by society, but generally speaking most gamers are not so antisocial to the point that they would refuse conversation with another person when given a chance.

Despite these fears, what is encouraging about the future of video games is the movement towards more social gaming opportunities that involve, and sometimes require, people to interact with each other to play. The first form of social interaction I will discuss occurs around the game console in the real world. Undoubtedly, this form of social interaction is closest to the generally conceived notion of “sociability,” being around other people and physically interacting with

them. Many games nowadays, such as the *Guitar Hero* and *Halo* franchises, feature multiplayer or co-operative (co-op) modes that allow gamers to play with their friends while simultaneously playing the game. In these games, players aim for the highest band score and slay enemies—all while working, coordinating, and communicating with each other to ensure the best possible results. Though there is an intermediary between the player and his friends, the social interaction is still present in-game, and, even better, this interaction is enhanced and driven by a desire to work well together and collaborate.

What's most interesting about this out-of-game social interaction is that with improvements in wireless communication technologies, players are now able to play these games with both offline and online players. In a sense, video games have opened up the social sphere to which the player can be exposed. A player in the United States can now play and potentially collaborate with others from the Europe, Asia, etc. Essentially, the newly emerging social spheres fostered by video games have the potential to allow for instantaneous global efforts of collaboration.

With the potential for improved *global* communication and team skill-building, some researchers hope to utilize these social aspects in local, smaller-scale education environments. One thing that most schools do not strongly emphasize for students is an effective collaborative and teamwork skill set; instead, most of the focus is placed on improved *individual* understanding of subjects. Occasionally, a teacher may assign a group project to students, but such efforts do not usually intend to foster teamwork as the core. The need to work well and cooperate with others is becoming more and more in demand in today's world, and video games and video game-based learning strategies will be able to promote such team-building abilities.

### ***Who's Doing What, Where, and How?***

Though I have explained how elements of game design may be able to influence educational environments, my arguments have little bearing and credibility without examples of implementation to support them. I will be the first to acknowledge that the “examples” that I have mentioned are merely ones that I have experienced through my own “investigations” and therefore are hardly substantial enough to serve as a backing for an educational model. To remedy this evidential deficiency, I will now cite individuals, organizations, and researchers who are currently investigating the capacity of games to teach both inside and outside of the classroom.

#### ***Making History Case Study***

In early 2011, William Watson of Purdue University conducted a case study in the high school classroom of a teacher, Mr. Irvine, utilizing the game *Making History: The Calm & The Storm* produced by Muzzy Lane Software. Set in the early 20<sup>th</sup> century, *Making History* allows the player to play as a variety of factions involved in World War II such as: Germany, Italy, Japan, China, France, The United Kingdom, The United States, or the USSR. The case study was conducted in two parts over the course of a week. In the first part, Irvine lectured as he regularly did on the subject matter that the game covers, namely World War II. The second part of the trial divided and assigned students to different in-game factions and assessed them based on their ability to adhere to certain historical goals and objectives. The differences between the two scenarios were noteworthy.

The game allowed students to actually see what they had only heard about during the first session—it gave them an improved contextual vision of the events of that had taken place.

Watson comments:

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What was the Munich Conference? Who was there? Why was it important? This was all content covered the previous day in his traditional lecture, but today the students have seen pieces of this in a different way. The students have been studying the game map and can see where Czechoslovakia is in relationship to Germany and the Soviet Union. They can see the historically accurate list of resources and allies they possess and can scan the map in order to figure out how to meet their needs.<sup>11</sup>

More so than actually seeing what they had been taught, students were able to experience the events first-hand. The game allowed students to consider the conditions and consequences that influenced their factions, such as scarcity of resources and socio-political relations, and then had them make decisions with those criteria in mind. Students were able to glimpse into the motivations that may have influenced factions to act the way they did. In short, students gained a degree of context and perspective into the World War II social climate. Watson mentions how:

Mr. Irvine uses all of this, as well as his previous lectures, to push his students towards the learning outcomes he most desires for his students for this unit: reflection on how Germany felt after World War I, the world-wide motivations for World War II, and an evaluation of whether or not the war as a whole could have been shortened or avoided completely.<sup>12</sup>

In addition to learning about what drove the war, students were able to think upon the deeper questions surrounding the war and to reassess and, more importantly, to reevaluate the events in terms of their own personal experiences. Obviously, the simulation of the events and the actual events are on two vastly differing scales of detail. Any method, however, that requires students to critically grapple with issues that more often than not are examined from few and limiting perspectives, will undoubtedly prove beneficial to the way the student interprets and understands the world.

Improved comprehension of content was not the only merit noted during the trial. Though Mr. Irvine made efforts to foster an interactive and engaging learning environment during his lecture, it was noted that some students still did not feel involved in the lesson. In comparison, the “active environment, where the teacher was removed from being the constant center of

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<sup>11</sup> William R. Watson, Christopher J. Mong, and Constance A. Harris. “A case study of the in-class use of a video game for teaching high school history.” *Computers & Education* 56, no. 2 (2011), 471.

<sup>12</sup> *Ibid.*, 471.



attention and information, resulted in a very different and more engaging experience.”<sup>13</sup> Rather than being a disseminator of information during the second part of the trial, Mr. Irvine instead became a facilitator who would provide students with relevant information whenever appropriate moments arose. Whenever such a situation would occur, Mr. Irvine would stop all game play in order to point out particularly relevant points and to make educational and contextual connections which he dubbed as “teachable moments.”

Even more encouraging, whenever students began to worry about their progress in the game, they would take the initiative to ask Mr. Irvine for assistance to help improve their gameplay strategies. As Watson relates, “Mr. Irvine’s expertise was in such demand while the game was being played that he spent most of the class period interacting with groups, interpreting the game environment, and explaining concepts such as embargos and non-aggression pacts in terms relatable to students.”<sup>14</sup> In response to their increased enthusiasm, Mr. Irvine “would take these opportunities to promote learning by asking his own questions or reminding them of discussions they had in preparation for playing the game, such as what had actually happened in the war.”<sup>15</sup> Students would ask questions because they were driven by a desire to know things that were relevant to them. Essentially, most people would not care what a Non-Aggression Pact was unless someone offered to enter into one with them. Additionally, students actually worried about the consequences of not having a keen knowledge of the subject and were more than willing to ask for help before their “grades” began to suffer.

After the trial’s completion, Watson met with students who accepted his requests to interview them. Watson relates:

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<sup>13</sup> Ibid., 469.

<sup>14</sup> Ibid., 470.

<sup>15</sup> Ibid., 472.

From the focus group sessions, it was mentioned that the hands-on aspect of the game was what helped students to be engaged to the material while they learned. One student stated that “It kind of gave you a visual of what happened, rather than just hearing it.” Another student agreed with this, saying “You learn easier too, because you’re not just sitting there looking at a book. You’re actually doing it. You have to visualize it in your head.” In this way, students were able to be naturally drawn into the content rather than having to determine relevance from words printed on a page.<sup>16</sup>

From this we learn that students responded strongly to the interactivity afforded by the game.

Watson mentions the quality of this engagement in the following:

The atmosphere of the classroom when the game was being played was drastically different than that of the traditional classroom. The room was filled with a tumult of noise as students spoke to each other about what was happening [sic] in the game. Interaction was not limited to within groups however as students were observed talking with members of other teams, suggesting treaties, requesting that resources be shared or even threatening/mockingly opposing teams and their countries.<sup>17</sup>

Even more exciting is the buzz that the trial experience created outside of the classroom, throughout the school. “As one student mentioned ‘We kind of formed a little UN over lunch’, another student ‘It was two or three different classes [discussing the game]. We were talking about different ideas of what to do,’ ”<sup>18</sup> comments Watson. In short, students were able to learn while enjoying it at the same time—an intriguing and promising result.<sup>19</sup>

Mr. Irvine had his own takeaways from the experience as well. Though he thought it was a more engaging and exciting experience for the students, he mentions that it does not relieve the teacher of his duties. Mr. Irvine comments on the experience: “I think, using the game, it’s a tool. The biggest thing I would tell people is the teacher has still got to be active in everything that’s going on. The game is not a replacement of the teacher. It’s just something for the teacher to use

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<sup>16</sup> Ibid., 472.

<sup>17</sup> Ibid., 469.

<sup>18</sup> Ibid., 470.

<sup>19</sup> Not everyone in the class felt wholly engaged by the experience. Some students treated the time in the computer lab as a free period and had limited participation in the group environment. Additionally, test results showed that some students did not develop an improved grasp of the topic. Watson was unable to interview these students who did not fully participate in the trial as a result of unreturned interview permission forms and therefore could not gain a full understanding of the method’s effectiveness and deficiencies. This non-engagement is important to investigate in order to ascertain why certain personalities do not take to this teaching style. If such models are to be utilized in the future, developers of such models will have to understand the different mentalities that students regard the teaching style with in order to work towards a more universal engagement experience. Individuality is a key component to consider in such a learning model.

to generate interest in the subject. So don't sit back and not be involved with what's going on.”<sup>20</sup>

Prensky advocates this approach as well saying, “even though kids are getting better and better (in many cases than the teachers) at finding and learning *content*, they still need teachers to help them put that information in *context*”.<sup>21</sup> Rather than potentially serving as replacement for the teacher, video games should instead be seen more as a classroom aid that can assist the teacher in relating the material. If implemented efficiently, students could gain so much more from their learning experience—and most importantly, they could be more willing to learn.

### *CellCraft*

Efforts to bring games into education aren't solely occurring inside the classroom. Many game developers are making strides towards producing games that can be used to teach outside the classroom as well. One flash-based computer game titled *CellCraft* exhibits a great introduction into the basics of cell biology and has already seen use in a number of classrooms across the country.<sup>22</sup> *CellCraft* has the player control a single-cell organism while receiving direction from a laboratory scientist. During the first level, the instructor exposes the player to a variety of the basic components of the cell including the centrosomes and the mitochondria and explains their functions.



Mitochondria

In addition to cellular structures, *CellCraft* describes how cells operate, move, and acquire the energy to perform those actions as exhibited below. In the example, the scientist asks you to move the cell. When the player does so, the scientist uses that context to teach the player about how cells use Adenosine Triphosphate (ATP) to move. Later on, the scientist discusses

<sup>20</sup> Ibid., 470.

<sup>21</sup> Prensky, *Don't Bother Me Mom—I'm Learning!*, 198.

<sup>22</sup> See “Teaching middle-schoolers to love cell science” (<http://www.wfu.edu/wowf/2010/20100511.CellCraft.php>) and “CellCraft – Video Game for Microbiologists” (<http://blog.media-freaks.com/CellCraft-video-game-microbiologists/>).

how the cell requires glucose to produce ATP in the mitochondria and therefore requires glucose to move, all at the moment you acquire your first molecule of glucose.

To engage the player even more, the game introduces an enemy for the player to defeat: a virus. Rather than the cell automatically activating its defensive measures, the game requires the player to produce the anti-viral mechanisms in order to protect the cell. This requires the player to be cognizant of which organelle, the components within the cell, produces which defensive



**Move the cell → Learn about the resource needed to move it → Obtain that resource**

agent and what cellular resources are required to construct those agents.

Essentially, the player has to learn the same things he would be required to learn in the classroom, except in this case, he is actually first-hand witnessing these processes in action, rather than reading about them in a book. He observes what happens to a cell when it does not have enough resources to produce virus-combating lysosomes or when the mitochondria are not provided with enough glucose to produce ATP—game over for both the player and the cell.



**Brief in-game overview on how a virus attacks a cell**

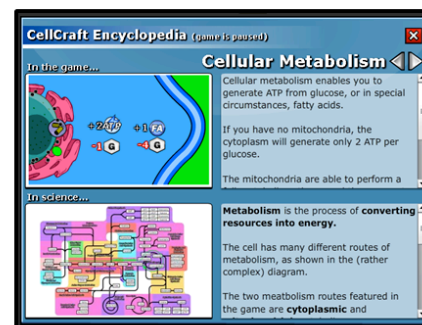
As players continue to play the game, the tasks become increasingly more complex. Players are required to maintain resources and search for extra supplies whenever necessary, all while fending off massive swarms of viral invaders. The player, however, should not be completely overwhelmed as the tasks he encounters are based on simpler ones encountered earlier in the game. By the time he reaches more intense levels, his knowledge of the structures and resources should be so well honed (otherwise he would be unable to complete the prior levels) that he should not have to give much thought to the function of specific organelles and instead can focus on enacting cell processes efficiently. The rote memorization often employed in teaching this subject becomes second nature when placed in a relevant context.



Increased Gameplay Complexity

On the note of contextuality, the game acknowledges that many of the facts are oversimplified in order to accommodate for simple gameplay. To address this content reduction, the designers included an in-game encyclopedia that allows the player to seek any information he did not quite understand or would like to learn more about.

Though *CellCraft* does arguably promote a more engaging learning environment than most classroom settings and makes the process of learning



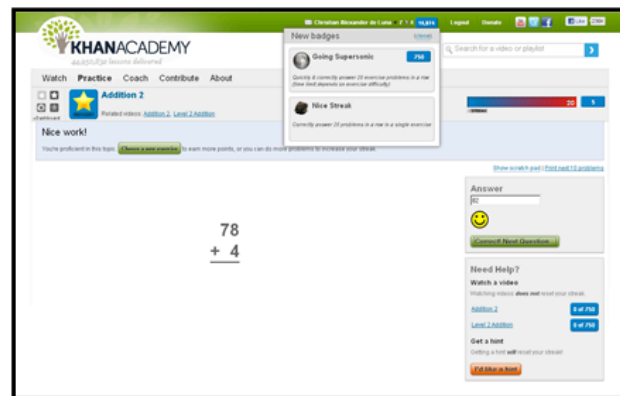
In-game Encyclopedia with Relevant Concept Comparisons

more enjoyable, there are short-comings to the method as well. For one, I found myself rushing through some of the informational text simply to proceed with gameplay and did not end up remembering some of the resources. Fortunately, knowing what each resource entailed was somewhat pivotal to proceeding with the game, and therefore, I was more than willing to backtrack to recall the information. Additionally, the aforementioned simplification of content does potentially run the risk of misleading students into misunderstanding the actual content. To that, I advocate that, as in the Watson experiment, a facilitating teacher is present to answer any questions whenever relevant and to engage students during applicable teaching moments.

### ***Khan Academy***

Created in 2006 by Salman Khan, Khan Academy is a not-for-profit educational organization that seeks to provide online tutorials in a variety of educational topics. Highly commended for his mission and methods, Salman Khan was endorsed by Bill Gates and Google among other entities to continue the work of his organization.

Upon starting an account on the Khan Academy website, one immediately discovers the abundance of game design mechanisms in the site. The following screenshot provides a glimpse into some of these gameplay elements at work. The preceding screen is taken from one of the



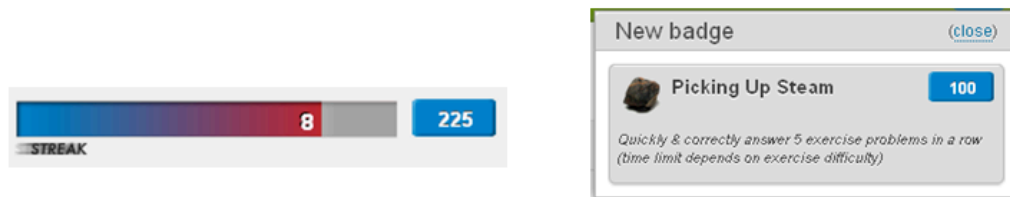
**Typical Gameplay Screen in Khan Academy**

earlier math levels, namely “Addition 2”. The screen displays a problem from the player to solve which he answers in the box on the right. If he answers correctly, then a smiley face instantly appears under the answer and then another questions pops up. If he answers incorrectly, he is met

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with a sad face and is to try again until he manages to solve the equation. Either way the player eventually answers the question correctly and ideally will be smiling as well when he finally does succeed.

Above the answer box is the streak meter which displays how many problems a player answers correctly in a row. When he provides an incorrect answer, the streak meter resets back to zero. When a player correctly answers a certain amount of questions in a certain amount of time, he is instantly awarded a badge to reflect his achievement. These two elements compounded

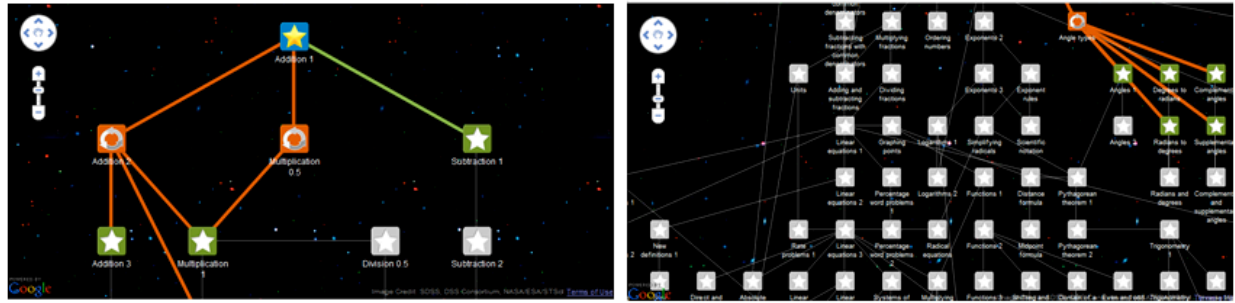


### Streak Meter and “Picking Up Steam” Badge

encourage the player to answer questions as fast as he possibly can while still requiring him to answer correctly. When the player’s streak meter reaches full, essentially when he levels-up, the system tells him that he has achieved mastery over the topic and encourages him to move onto a harder difficulty level or a different subject matter depending on what *he desires* to study.

In addition to the use of level up and achievement aspects of game design, Khan Academy also employs a skill tree similar to ones found in many games such as World of Warcraft as previously mentioned. Once a player masters a certain skill, the options for his progression are displayed on a graph that allows him to choose the topic he would like to learn next. The player is only allowed to select and learn skills that have been unlocked, which is done by mastering the skills that precede it in the tree. The further the player progresses through the game, the more filled-out his skill tree becomes, giving him a measure of his progress. He can

see what he has already learned, where he can currently learn, and what he could potentially



**Khan Academy Skill Tree**

learn in the future.

### ***Some Final Words...***

From this discussion, I hope that I have somewhat demonstrated the potential video games hold for improving the way we educate. As I have already mentioned, there is still very much to research before video games and game design elements can (or, more importantly, should) efficiently be used in the classroom. For one, it still remains to be confirmed if video games and game design elements can *actually* promote engaging and enjoyable learning environments and if students *actually* learn in them. That is the current task facing researchers today.

Only limited amounts of research have been conducted into the subject matter to date. As the reader has most likely observed, a great majority of the examples provided in this article have been drawn from my own personal experiences. Individual experience is core to this educational model; nevertheless, it remains vital to prove that such personal improvements do indeed occur on a general scale (as ironic as that may sound) before we can begin implementing these strategies in the classroom. The need to produce more empirical results that can either confirm or disprove (both equally important results) these methods is an imperative for the field and is my motivation for writing this article. With a limited background with regard to this massive

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interdisciplinary endeavor, I can only do what I am capable of—namely, utilize my own personal experiences to expose and entice those who do have solid academic backgrounds into considering this method. I know that video games have great potential for improving education, but what is more important is reaching out to those who can actually investigate that potential.

Now, I must also state that I am not an eternal optimist who believes only good can come from video games. I do not believe that video games will be a panacea<sup>23</sup> for all the troubles in education. I know many worry about the potential pitfalls of implementing games in the classroom. The trivialization of subject content or the potential indulging of the student are all serious issues which must be looked into while researching actual implementation. For that reason, it is imperative for many eyes to look into the subject and many voices to speak about it—whether for or against it. Innovation without foresight has the potential to disparage great endeavors.

One final note is that as an avid gamer, I personally have experienced some of the detriments of video games. I have skipped whole meals, neglected assignments, and ignored friends and family in order to get through countless games. Nevertheless, what I want people to be willing to understand is that video games are not all bad. They are not all sex and violence. There is a whole untold side to them that only gamers know. Though some games I will admit are inane and trivial, there are some that have told me amazing stories, have exposed me to incredible scores, and have immersed me in incredible worlds. There is a lot we can learn from games whether it be for education, social change, or life in general. We would be remiss in not giving them a chance.

So, in closing, don't fear the game.

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<sup>23</sup> Side note: 'panacea' is a word I learned from a video game.

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